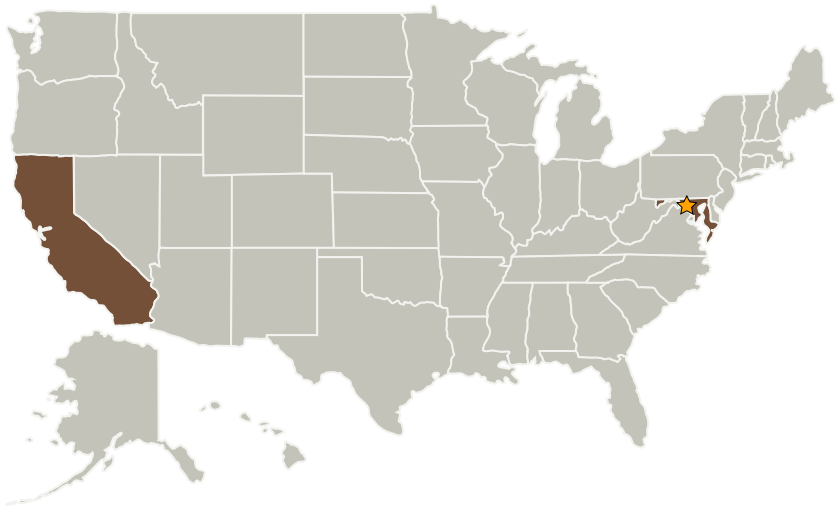
High Interactivity Visualization Software for Large Computational Data Sets, Phase II

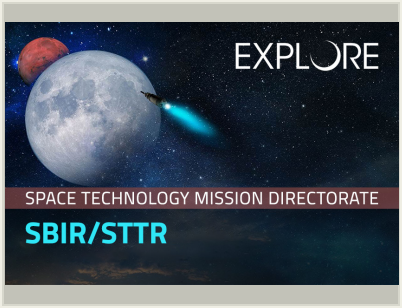
Completed Technology Project (2009 - 2011)

Project Introduction

Existing scientific visualization tools have specific limitations for large scale scientific data sets. Of these four limitations can be seen as paramount: (i) memory management, (ii) remote visualization, (iii) interactivity, and (iv) specificity. In Phase I, we proposed and successfully developed a prototype of a collection of computer tools and libraries called SciViz that overcome these limitations and enable researchers to visualize large scale data sets (greater than 200 gigabytes) on HPC resources remotely from their workstations at interactive rates. A key element of our technology is the stack oriented rather than a framework driven approach which allows it to interoperate with common existing scientific visualization software thereby eliminating the need for the user to switch and learn new software. The result is a versatile 3D visualization capability that will significantly decrease the time to knowledge discovery from large, complex data sets. Typical visualization activity can be organized into a simple stack of steps that leads to the visualization result. These steps can broadly be classified into data retrieval, data analysis, visual representation, and rendering. Our approach will be to continue with the technique selected in Phase I of utilizing existing visualization tools at each point in the visualization stack and to develop specific tools that address the core limitations identified and seamlessly integrate them into the visualization stack. Specifically, we intend to complete technical objectives in four areas that will complete the development of visualization tools for interactive visualization of very large data sets in each layer of the visualization stack. These four areas are: Feature Objectives, C++ Conversion and Optimization, Testing Objectives, and Domain Specifics and Integration. The technology will be developed and tested at NASA and the San Diego Supercomputer Center.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
SciberQuest, Inc.	Supporting Organization	Industry	Del Mar, California

Primary U.S. Work Locations	
California	Maryland

Project Transitions

January 2009: Project Start

January 2011: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis